It may now be seen how difficult and complicated a problem it is to find a radiant point from a series of observations of meteor tracks extending over some length of time.

The accurate method would be the following:—

From a few meteor paths traced on a celestial chart an approximate position of the radiant is to be found; from this the three corrections should be determined for every observation of a meteor; the corrected paths of the meteors again mapped, and then a more accurate position of the radiant may be found.

On the large Sun-spot of 1892 *February* 5–18, *and the Associated Magnetic Disturbance.*

(*Communicated by the Astronomer Royal.*)

As the large spot seen on the Sun 1892 February 5–18 was the largest which has been photographed at Greenwich, and as its presence appears to have been associated with a great magnetic disturbance, some particulars may be of interest, though they must necessarily be imperfect pending the arrival of photographs from India and Mauritius to supplement the Greenwich series.

At Greenwich photographs of the Sun were obtained on five days during the first appearance of the group, viz. on February 5, 13, 16, 17, and 18; and up to the present time on three days during its second appearance, viz. on March 5, 7, and 8. The following table gives the heliographic coordinates of the centre of the great spot, and the total area of the entire group, expressed in millionths of the Sun's visible hemisphere, for each day of observation during its first appearance:—

Date. G. Civil T.	Distance from Centre in terms of Sun's Radius.	Position-Angle from Sun's Axis.	Heliographic Longitude from Central Meridian.	Heliographic Longitude from Prime Meridian.	Heliographic Latitude.	Area. Umbra.	Area. Whole Spot.
h m		°	°	°	°		
Feb. 5 10 24	0·985	118·4	−81·9	259·0	−29·0	96	1522
13 9 47	0·488	217·5	+19·8	255·6	−29·2	451	2999
16 9 40	0·859	248·4	+58·5	254·9	−28·1	256	2288
17 12 10	0·938	241·3	+70·4	252·3	−29·3	139	1433
18 11 58	0·986	240·6	+82·5	251·3	−30·1	84	1389

The great spot was on the central meridian February 11, 22^h G.C.T. On February 13, when the group was best seen, being then nearer the centre of the disc than on any of the other days of observation, the group extended in heliographic longitude from 270° to 245°, a length of 25°; and in heliographic latitude

from 23° S. to 33° S., a breadth of 10°. The principal spot of the group had a length of 14°, from 263° to 249°, and a breadth of 8°, from 25° S. to 33° S.

The group had greatly diminished in area when it reappeared on the east limb on March 5.

The following table gives the position of the principal spot and area of the entire group, as observed up to the present time, during its second appearance :—

Date. G. Civil T.	Distance from Centre in terms of Sun's Radius.	Position-Angle from Sun's Axis.	Heliographic Longitude from Central Meridian	Heliographic Longitude from Prime Meridian.	Heliographic Latitude.	Area. Umbra.	Area. Whole Spot.
h m		°	°	°	°		
Mar. 5 9 51	0·927	118·3	−68·4	250·9	−28·8	28	208
7 9 54	0·714	124·0	−42·4	250·4	−28·9	34	510
8 10 39	0·571	132·8	−28·5	250·8	−29·2	35	521

It will be seen that the group has greatly diminished in area during the fortnight in which it was on the further side of the Sun. There seems, however, a slight tendency to increase again, especially with regard to the principal spot, the area of which rose from 101 on March 5 to 369 and 448 on March 7 and 8. The great spot has undergone but little change of place during the interval, for its latitude has remained practically unchanged, and though its longitude, as computed with a sidereal period of 25·38 days, appears to show a slight diminution, this is due to the rotation period of the Sun being longer for high latitudes, the rotation period adopted corresponding to a latitude of about 15°.

A great magnetic disturbance, accompanied by an aurora, occurred on 1892 February 13–14, commencing about a day after the large spot was on the central meridian of the Sun's disc. The following particulars have been drawn up by Mr. Ellis :—

The magnetic disturbance commenced in all elements on February 13 at $5^h\ 32^m$, Greenwich Civil Time, by a sudden increase of declination, horizontal force, and vertical force, accompanied by strong manifestation of earth currents. Large motions were registered in all elements; between February 13, 19^h, and February 14, 3^h, they were unusually large, amounting to more than 1° in declination, the trace having passed off the sheet for one hour shortly after midnight. In horizontal force the disturbance exceeded 0·029 of the whole horizontal force, the trace having similarly passed off the sheet for nearly half an hour at about 22^h, and afterwards for more than $1\frac{1}{2}$ hours from shortly before 1^h to $2\frac{1}{2}^h$. In vertical force the disturbance was also great, the trace having gone off the sheet in the direction of increasing force from $14\frac{1}{2}^h$ to 19^h, and in the direction of decreasing force from $0\frac{1}{2}^h$ to 2^h; the motion probably exceeded 0·020 of the whole vertical force. The disturbance ceased on the evening of

February 14. An aurora was seen at Greenwich between 0^h and 1^h, by Mr. McClellan.

The disturbance compares in magnitude with those of 1882 April and November, the registered motions being large in all elements on all three occasions. The disturbance of 1882 November was, however, extreme, the motions then registered being apparently in excess even of those of 1882 April and 1892 February.

The following table shows how the recent disturbance compares with previous ones recorded since the commencement of the Greenwich series of solar photographs in 1873.

Particulars of Magnetic Disturbances from the Photographic Registers at the Royal Observatory, Greenwich.

Period of Disturbance. Greenwich Civil Time.	Character of Disturbance.	Extreme amplitude of Motion during Disturbance. Declination.	Horizontal Force.	Vertical Force.
		° ′		
1880 Aug. 12 12h to Aug. 14 8h	*c*	1 5	·016	·008
1881 Jan. 31 12 ,, Feb. 1 3	*c*	1 15	·018	·008
Sept. 12 12 ,, Sept. 14 2	*c*	1 0	·017	·008
1882 Apr. 16 23 ,, Apr. 17 23	*g*	1 0+	·030+	·022+
Apr. 20 3 ,, Apr. 21 8	*g*	1 10+	·020+	·008
Oct. 2 10 ,, Oct. 3 3	*c*	1 0	·014	no register
Nov. 17 10 ,, Nov. 21 4	*g*	1 50	·050+	·025
Nov. 21 15 ,, Nov. 22 0	*m*	0 40	·010	·003
1883 Sept. 16 3 ,, Sept. 17 17	*c*	0 50	·019	·005+
1884 July 2 19 ,, July 4 6	*c*	0 40	·018	·007
Oct. 1 22 ,, Oct. 3 6	*m*	0 30	·010	·004
Nov. 2 13 ,, Nov. 3 8	*m*	0 45	·012	·005
1885 Mar. 15 10 ,, Mar. 16 6	*c*	0 55	·010	·009
1886 Mar. 30 8 ,, Apr. 1 3	*c*	1 5	·020+	·007
1892 Feb. 13 5 ,, Feb. 14 18	*g*	1 10+	·029+	·015+

In the column "Character of Disturbance" *m* indicates moderate; *c*, considerable; and *g* great.

The amplitudes in the case of Horizontal Force and Vertical Force are given in parts of these forces respectively.

The sign + attached to a measure indicates that the spot of light passed beyond the limit of registration.

Most of these magnetic disturbances occurred when an exceptionally large spot was visible on the Sun near the centre of the disc, or about the time of some great change in a Sun-spot.

Royal Observatory, Greenwich:
1892 *March* 11.

Addendum.

Since this note was drawn up, Mr. Maunder has found, from an examination of the photographs at Greenwich, that this Sun-spot appeared on the Sun on 1891 November 15, when it came into view close to the east limb as a spot of considerable size. It was also photographed at its appearances in December 1891 and January 1892, so that it has persisted through five rotations, with, however, a remarkable progressive drift in latitude from about 17° S. to 30° S. Several magnetic disturbances have occurred during its presence on the Sun, three being subsequent to that on February 13, described above, viz.: March 1^d 0^h to 16^h (moderate), 0° 45′ in declination; March 6^d 9^h to 7^d 9^h (considerable), 0° 50′ in declination; March 11^d 10^h to 13^d 5^h (great), 1° 15′ in declination.

Royal Observatory, Greenwich:
1892 *March* 25.

On the Photographic Magnitude of Nova Aurigæ, as Determined at the Royal Observatory, Greenwich. By W. H. M. Christie, M.A., F.R.S., Astronomer Royal.

A telegram notifying the receipt by Dr. Copeland of an anonymous postcard, which announced the discovery of a new star in *Auriga*, was received at Greenwich at about 5 P.M. on Feb. 1, and a few hours afterwards Mr. Criswick obtained a photograph of the Nova with the 13-inch photographic telescope. Photographs of the new star have been taken at every available opportunity since, with exposures ranging from 15^s to 12^m, and the diameters of the images of the Nova and of certain comparison stars have been measured under the microscope with a filar micrometer, with a view to determining the changes in photographic magnitude of the Nova. Independently of this special object, the discussion has a general interest in relation to the problem of determining the magnitudes of stars for the photographic chart.

On each plate the diameters of the images of the Nova, of four Argelander stars (B.D.+30°, Nos. 944, 949, 938, and 913), ranging from 8·2 to 8·7 mag. (Argelander), and of a 5·7 mag. star (B.D.+30° 898), were measured, and the magnitude of the Nova was inferred from those of the comparison stars by means of the formula

$$m = 2{\cdot}5(\log t - 0{\cdot}97\sqrt{d}) + \text{const.}$$

given in the *Monthly Notices*, vol. lii., p. 146, the measures of the comparison stars being used to determine the value of the constant for each plate. The magnitudes of the four 8–9 mag.